

Claims:

1. An  $E_{op}$  process for bleaching chemical pulp, which comprises:  
providing said chemical pulp;  
providing an  $E_{op}$  aqueous bleaching solution comprising a peroxide  
5 compound, an oxygen-containing material, sodium hydroxide and magnesium  
hydroxide, in the absence of magnesium sulfate; and  
bleaching said chemical pulp with said  $E_{op}$  aqueous bleaching solution to  
form  $E_{op}$  bleached chemical pulp.
2. The process of claim 1, wherein the amount of sodium hydroxide in  
10 said  $E_{op}$  aqueous bleaching solution is at not more than about 8 % by weight, based  
on the O.D. weight of said  $E_{op}$  chemical pulp.
3. The process of claim 1, wherein the ratio of sodium hydroxide to  
magnesium hydroxide in said  $E_{op}$  aqueous bleaching solution is not more than  
about 5:1 (based on an OH- molar ratio).
- 15 4. The process of claim 1, wherein the pulp viscosity of a final  
bleached chemical pulp is at least substantially the same as the final pulp viscosity  
of bleached chemical pulp which is bleached with the same total amount of an  $E_{op}$   
aqueous bleaching solution comprising said peroxide compound, an oxygen-  
containing material, sodium hydroxide, with or without magnesium sulfate, in the  
20 absence of magnesium hydroxide.
5. The process of claim 1, wherein the final pulp brightness of said  $E_{op}$   
bleached chemical pulp produced from the  $E_{op}$  bleached chemical pulp is at least  
substantially the same as the final pulp brightness of bleached chemical pulp which  
is bleached with same bleach sequence containing the same total amount of an  $E_{op}$   
25 aqueous bleaching solution comprising said peroxide compound, an oxygen-  
containing material, sodium hydroxide, with or without magnesium sulfate, in the  
absence of magnesium hydroxide.
6. The process of claim 1, wherein the COD of bleach effluent from  
an  $E_{op}$  stage using said  $E_{op}$  aqueous bleaching solution is less than the COD of  
30 bleach effluent from an  $E_{op}$  stage which uses the same total amount of an  $E_{op}$   
aqueous bleaching solution comprising said peroxide, an oxygen-containing

material compound, sodium hydroxide, with or without magnesium sulfate, in the absence of magnesium hydroxide.

7. The process of claim 1, which further includes the step of providing an E<sub>p</sub> aqueous bleaching solution comprising a peroxide compound, sodium hydroxide and magnesium hydroxide, in the absence of magnesium sulfate; and bleaching said E<sub>op</sub> bleached chemical pulp with said E<sub>p</sub> aqueous bleaching solution to form E<sub>p</sub> bleached chemical pulp.

8. The process of claim 1, which further includes the step of providing an E<sub>p</sub> aqueous bleaching solution consisting essentially of a peroxide compound, sodium hydroxide and magnesium hydroxide; and bleaching said E<sub>op</sub> bleached chemical pulp with said E<sub>p</sub> aqueous bleaching solution to form E<sub>p</sub> bleached chemical pulp.

9. The process of claim 1, wherein the wet zero span tensile strength of said E<sub>op</sub> bleached chemical pulp is at least substantially the same as the wet zero span tensile strength of bleached chemical pulp which is bleached with the same total amount of an E<sub>op</sub> aqueous bleaching solution comprising said peroxide compound, an oxygen-containing material, sodium hydroxide, with or without magnesium sulfate, in the absence of magnesium hydroxide.

10. The process of claim 1, wherein the COD in the bleach effluent of said bleached E<sub>op</sub> chemical pulp is at least about 5 % less than the COD in beach effluent of said bleached chemical pulp which is bleached with the same total amount of an E<sub>op</sub> aqueous bleaching solution comprising said peroxide compound, an oxygen-containing material, sodium hydroxide, with or without magnesium sulfate, in the absence of magnesium hydroxide.

11. An E<sub>op</sub> process for bleaching chemical pulp, which comprises: providing said chemical pulp; providing an E<sub>op</sub> aqueous bleaching solution consisting essentially of a peroxide compound, an oxygen-containing material, sodium hydroxide and magnesium hydroxide; and

bleaching said chemical pulp with said E<sub>op</sub> aqueous bleaching solution to form said bleached chemical pulp.

12. The process of claim 11, wherein the amount of sodium hydroxide in said E<sub>op</sub> aqueous bleaching solution is at not more than about 8 % by weight, based on the O.D. weight of said E<sub>op</sub> chemical pulp.

13. The process of claim 11, wherein the ratio of sodium hydroxide to  
5 magnesium hydroxide in said E<sub>op</sub> aqueous bleaching solution is not more than about 5:1 (based on an OH<sup>-</sup> molar ratio).

14. The process of claim 11, wherein the pulp viscosity of a final bleached chemical pulp produced from the E<sub>op</sub> bleached chemical pulp is at least substantially the same as the final pulp viscosity of bleached chemical pulp which  
10 is bleached with the same total amount of an E<sub>op</sub> aqueous bleaching solution comprising said peroxide compound, an oxygen-containing material, sodium hydroxide, with or without magnesium sulfate, in the absence of magnesium hydroxide.

15. The process of claim 11, wherein the final pulp brightness of said  
15 E<sub>op</sub> bleached chemical pulp is at least substantially the same as the final pulp brightness of bleached chemical pulp which is bleached with same bleach sequence containing the same total amount of an E<sub>op</sub> aqueous bleaching solution comprising said peroxide compound, an oxygen-containing material, sodium hydroxide, with or without magnesium sulfate, in the absence of magnesium  
20 hydroxide.

16. The process of claim 11, wherein the COD of bleach effluent from an E<sub>op</sub> stage using said E<sub>op</sub> aqueous bleaching solution is less than the COD of bleach effluent from an E<sub>op</sub> stage which uses the same total amount of an E<sub>op</sub> aqueous bleaching solution comprising said peroxide, an oxygen-containing  
25 material compound, sodium hydroxide, with or without magnesium sulfate, in the absence of magnesium hydroxide.

17. The process of claim 11, which further includes the step of providing an E<sub>p</sub> aqueous bleaching solution comprising a peroxide compound, sodium hydroxide and magnesium hydroxide, in the absence of magnesium  
30 sulfate; and bleaching said E<sub>op</sub> bleached chemical pulp with said E<sub>p</sub> aqueous bleaching solution to form E<sub>p</sub> bleached chemical pulp.

18. The process of claim 11, which further includes the step of providing an  $E_p$  aqueous bleaching solution consisting essentially of a peroxide compound, sodium hydroxide and magnesium hydroxide; and bleaching said  $E_{op}$  bleached chemical pulp with said  $E_p$  aqueous bleaching solution to form  $E_p$  bleached chemical pulp.

19. The process of claim 11, wherein the wet zero span tensile strength of said  $E_{op}$  bleached chemical pulp is at least substantially the same as the wet zero span tensile strength of bleached chemical pulp which is bleached with the same total amount of an  $E_{op}$  aqueous bleaching solution comprising said peroxide compound, an oxygen-containing material, sodium hydroxide, with or without magnesium sulfate, in the absence of magnesium hydroxide.

20. The process of claim 11, wherein the COD in the bleach effluent of said bleached  $E_{op}$  chemical pulp is at least about 5 % less than the COD in beach effluent of said bleached chemical pulp which is bleached with the same total amount of an  $E_{op}$  aqueous bleaching solution comprising said peroxide compound, an oxygen-containing material, sodium hydroxide, with or without magnesium sulfate, in the absence of magnesium hydroxide.

21. An  $E_{op}$  aqueous chemical solution for bleaching chemical pulp, which comprises an  $E_{op}$  aqueous bleaching solution consisting essentially of a peroxide compound, an oxygen-containing material, sodium hydroxide and magnesium hydroxide.

22. The  $E_{op}$  aqueous bleaching solution of claim 21, wherein the amount of sodium hydroxide in said  $E_{op}$  aqueous bleaching solution is at not more than about 8% by weight, based on the O.D. weight of said chemical pulp.

23. The  $E_{op}$  aqueous bleaching solution of claim 21, wherein the ratio of sodium hydroxide to magnesium hydroxide in said  $E_{op}$  aqueous bleaching solution is not more than about 5:1 (based on an OH<sup>-</sup> molar ratio).

24. The  $E_{op}$  aqueous bleaching solution of claim 21, wherein the pulp viscosity of the final chemical pulp produced using said  $E_{op}$  aqueous bleaching solution is at least substantially the same as the pulp viscosity of final bleached chemical pulp which is bleached with the same total amount of an  $E_{op}$  aqueous

bleaching solution comprising said peroxide, an oxygen-containing material compound, sodium hydroxide, with or without magnesium sulfate, in the absence of magnesium hydroxide.

25. The E<sub>op</sub> aqueous bleaching solution of claim 21, wherein the pulp  
5 brightness of E<sub>op</sub> bleached chemical pulp produced using said E<sub>op</sub> aqueous bleaching solution is at least substantially the same as the pulp final brightness of bleached chemical pulp which is bleached with a bleaching sequence containing the same total amount of an E<sub>op</sub> aqueous bleaching solution comprising said  
10 peroxide, an oxygen containing compound, sodium hydroxide, with or without magnesium sulfate, in the absence of magnesium hydroxide.

26. The E<sub>op</sub> aqueous bleaching solution of claim 21, wherein the COD  
of bleach effluent produced using said E<sub>op</sub> aqueous bleaching solution is less than the COD of bleach effluent which is produced by the same total amount of an E<sub>op</sub>  
15 aqueous bleaching solution comprising said peroxide compound, an oxygen-containing material, sodium hydroxide, with or without magnesium sulfate, in the absence of magnesium hydroxide.

27. The E<sub>op</sub> aqueous bleaching solution of claim 21, wherein the ratio  
of sodium hydroxide to magnesium hydroxide in said E<sub>op</sub> aqueous bleaching solution is not more than about 3:1 (based on an OH<sup>-</sup> molar ratio).

28. The E<sub>op</sub> aqueous bleaching solution of claim 21, wherein the ratio  
20 of sodium hydroxide to magnesium hydroxide in said E<sub>op</sub> aqueous bleaching solution is not more than about 1:2 (based on an OH<sup>-</sup> molar ratio).

29. The E<sub>op</sub> aqueous bleaching solution of claim 21, wherein the wet  
zero span tensile strength of E<sub>op</sub> bleached chemical pulp produced using said E<sub>op</sub>  
25 aqueous bleaching solution is at least substantially the same as the wet zero span tensile strength of bleached chemical pulp which is bleached with the same total amount of an E<sub>op</sub> aqueous bleaching solution comprising said peroxide compound, an oxygen-containing material, sodium hydroxide, with or without magnesium sulfate, in the absence of magnesium hydroxide.

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30. The E<sub>op</sub> aqueous bleaching solution of claim 21, wherein COD in the bleach effluent of said bleached E<sub>op</sub> chemical pulp is at least about 5 % less than the COD in the bleach effluent of said bleached chemical pulp which is bleached with the same total amount of an E<sub>op</sub> aqueous bleaching solution comprising said peroxide compound, an oxygen-containing material, sodium hydroxide, with or without magnesium sulfate, in the absence of magnesium hydroxide.

31. An E<sub>p</sub> process for bleaching chemical pulp, which comprises:  
providing said chemical pulp;  
providing an E<sub>p</sub> aqueous bleaching solution comprising a peroxide compound, sodium hydroxide and magnesium hydroxide, in the absence of magnesium sulfate; and  
bleaching said chemical pulp with said E<sub>p</sub> aqueous bleaching solution to form said bleached chemical pulp.

32. An E<sub>p</sub> process for bleaching chemical pulp, which comprises:  
providing said chemical pulp;  
providing an E<sub>p</sub> aqueous bleaching solution consisting essentially of a peroxide compound, sodium hydroxide and magnesium hydroxide; and  
bleaching said chemical pulp with said E<sub>p</sub> aqueous bleaching solution to form said bleached chemical pulp.

33. An E<sub>p</sub> aqueous chemical solution for bleaching chemical pulp, which comprises an E<sub>p</sub> aqueous bleaching solution consisting essentially of a peroxide compound, sodium hydroxide and magnesium hydroxide.

34. A process for bleaching chemical pulp, which comprises:  
providing said chemical pulp;  
providing an E<sub>op</sub> aqueous bleaching solution;  
bleaching said chemical pulp with said E<sub>op</sub> aqueous bleaching solution to form E<sub>op</sub> bleached chemical pulp;  
providing an E<sub>p</sub> aqueous bleaching solution comprising a peroxide compound, sodium hydroxide and magnesium hydroxide, in the absence of magnesium sulfate; and

bleaching said E<sub>op</sub> bleached chemical pulp with said E<sub>p</sub> aqueous bleaching solution to form E<sub>p</sub> bleached chemical pulp.

35. A process for bleaching chemical pulp, which comprises:

providing said chemical pulp;

5 providing an E<sub>op</sub> aqueous bleaching solution;

bleaching said chemical pulp with said E<sub>op</sub> aqueous bleaching solution to form E<sub>op</sub> bleached chemical pulp;

providing an E<sub>p</sub> aqueous bleaching solution consisting essentially of a peroxide compound, sodium hydroxide and magnesium hydroxide; and

10 bleaching said E<sub>op</sub> bleached chemical pulp with said E<sub>p</sub> aqueous bleaching solution to form E<sub>p</sub> bleached chemical pulp.

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